Patent Claims

1. Externally mixing burner (1) having a burner head (2), at least one combustion gas tube (3) and at least one tube (4) for an oxygen-containing gas, whereby the burner head (2) has outlet openings out of the combustion gas tube (3) and out of the tube (4) for the oxygen-containing gas, characterized in that gas inlet lines (6, 7) are provided for the combustion gas and for oxygen-containing gas, each being connected to a source for combustion gas and/or for oxygen-containing gas, respectively, and of these, at least one gas inlet line (6, 7) opening eccentrically into a swirl chamber (8, 9), which is arranged between the gas inlet line (6) and the combustion gas tube (3) and/or between the gas inlet line (7) and the tube (4) for oxygen-containing gas.

2. Burner (1) according to Claim 1, characterized in that at least one of the gas inlet lines (6, 7) is divided into two lines (6a, 6b, 7a, 7b) upstream of the swirl chamber (8, 9), whereby one of these lines (6a, 7a) opens eccentrically into the swirl chamber (8, 9) and the other of these lines (6b, 7b) opens directly into the combustion gas tube (3) and/or into the tube (4) for oxygen-containing gas.

3. Burner (1) according to Claim 1 or 2, characterized in that valves (10, 11, 12, 13) are provided in the gas inlet lines (6, 7), in particular valves (10, 11, 12, 13) being provided in the part of the gas inlet lines (6, 7) in which at least one gas inlet line (6, 7) is already divided into two lines (6a, 6b, 7a, 7b), and a control unit or regulating unit is available, controlling or regulating the degrees of opening of the valves (10, 11, 12, 13), so that the shape of the flame of the burner (1) is adjustable.

4. Burner (1) according to one of Claims 1 through 3, characterized in that the valves (10, 11, 12, 13) are designed as solenoid valves (10, 11, 12, 13).

5. Burner (1) according to one of Claims 1 through 4, characterized in that the swirl chamber (8, 9) has a circular cross section in a section perpendicular to the longitudinal axis of the combustion gas tube (3).

6. Burner (1) according to Claim 5, characterized in that the gas inlet line (6, 7, 6a, 7a) opens tangentially into the swirl chamber (8, 9).

7. Method for operating an externally mixing burner (1) having at least one combustion gas tube (3) and at least one tube (4) for oxygen-containing gas, through which combustion gas and/or oxygen-containing gas flows to the burner head (2), characterized in that the combustion gas and/or the oxygen-containing gas is introduced eccentrically into a swirl chamber (8, 9) in which a swirl flow is impressed upon the combustion gas and/or the oxygen-containing gas and the combustion gas and/or oxygen-containing gas is supplied to the combustion gas tube (3) and/or the tube (4) for oxygen-containing gas after leaving the swirl chamber (8, 9).

8. Method according to Claim 7, characterized in that the quantities of combustion gas and oxygen-containing gas supplied to the burner (1) per unit of time through the swirl chamber (8, 9) and without the swirl chamber (8, 9) are controlled and/or regulated, whereby the combustion gas and the oxygen-containing gas are sent through valves (10, 11, 12, 13) whose degrees of opening are controlled or regulated so that the burner (1) produces a flame having a desired shape which is adjustable via the control and/or regulating unit.

9. Method according to Claim 7 or 8, characterized in that air is used as the oxygen-containing gas.

10. Method according to Claim 7 or 8, characterized in that oxygen-enriched air is used as the oxygen-containing gas.

11. Method according to Claim 7 or 8, characterized in that a gas having an oxygen content greater than the oxygen content of air, in particular an oxygen content greater than 30 vol%, is used as the oxygen-containing gas.

12. Method according to Claim 11, characterized in that a gas having an oxygen content greater than 70 vol%, in particular greater than 99.5 vol%, is used as the oxygen-containing gas.

13. Method according to one of Claims 7 through 12, characterized in that a swirl flow is impressed upon the combustion gas flow.

14. Method according to one of Claims 7 through 13, characterized in that a swirl flow is impressed upon the flow of oxygen-containing gas.

15. Method according to one of Claims 7 through 14, characterized in that co-rotating swirl flows are impressed upon the combustion gas flow and the flow of oxygen-containing gas.

16. Method according to one of Claims 7 through 14, characterized in that contra-rotating swirl flows are impressed upon the combustion gas flow and the flow of oxygen-containing gas.

17. Use of the externally mixing burner (1) according to one of Claims 1 through 6 for melting metal or glass.